

Congressional Notification Profile

DE-PS26-02NT41369

UNIVERSITY COAL RESEARCH PROGRAM, INNOVATIVE CONCEPTS PROGRAM

University at Albany

Background and Technical Information:

Project Title: "Feasibility of a SOFC Stack Integrated Optical Chemical Sensor."

This project proposes to design and integrate chemical sensors into a solid oxide fuel cell stack to detect hydrogen, methane, carbon monoxide and hydrogen sulfide at operating conditions and temperatures. Materials optimization will be performed to heighten the sensors' sensitivity and their ability to select specific chemicals in a reasonable amount of time.

Contact Information:

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Congressional District: 21 District County: Albany

Financial Information:

Length of Contract (months): 12

Government Share: \$49,938

Total value of contract: \$62,108

DOE Funding Breakdown:

Funds: FY 2002 \$49,938

ABSTRACT

Title: Feasibility of a SOFC Stack Integrated Optical Chemical Sensor

The proposed work is designed as a demonstration of the chemical sensing capabilities of nano-cermet SPR bands at solid oxide fuel cell operating conditions. Key to this proposal is that the materials choice uses a YSZ ceramic matrix, which upon successful demonstration of this concept will allow integration directly into the SOFC stack. Under this Innovative Concepts Program the University at Albany Institute for Materials (UAIM) will synthesize, analyze and test Pa, Au and Pt doped YSZ nano-cermet as a function of operating temperature and target gas exposure (hydrogen, methane, carbon monoxide and hydrogen sulfide). During the aforementioned testing procedure the SPR bands of each individual nano-cermet will be monitored to determine the sensor selectivity and sensitivity. Materials optimization of the nano-cermet will be performed to achieve the required sensitivity, selectivity and time response of the chemical sensor. Upon completion of this work, it is anticipated that the following objectives will be met:

- Design of thermally stable nano-cermet using radio frequency magnetron sputtering techniques
- Synthesis of nano-cermet with a narrow particle diameter distribution
- Probe surface plasmon resonance (SPR) properties as a function of temperature and chemical exposure

Sponsoring Organization:

Albany NanoTech

University at Albany Institute of Materials (UAIM)

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